

REMARKS

Applicants thank the Examiner for the thorough consideration given the present application. Claims 1-14 are currently being prosecuted. The Examiner is respectfully requested to reconsider his rejections in view of the amendments and remarks as set forth below.

Rejections Under 35 U.S.C. § 102

Claim 6 and 8-10 stand rejected under 35 U.S.C. § 102 as being anticipated by Japanese document 4-64975. This rejection is respectfully traversed.

The Examiner states that this reference shows a star connection having a base of insulating resin material and a terminal ring which is spring-fitted to the base and having a number of terminals for connection on one end of each coil. Applicant disagrees with the Examiner's understanding of this reference.

In particular, the Examiner states that the ring is spring-fitted at 2. It appears that the base 1 has a simple upstanding portion with an outer radius which matches the inner radius of the terminal ring. Thus, the ring slips over the upstanding portion 3, except for projecting elements 2 which act to overlay the ring and hold it in position. Although it is not clear how the ring is installed over the projecting portions, it is assumed that there is enough resilience that the ring can be forced thereover so that the projections then lock the ring into position. Applicant disagrees with the Examiner that this reference meets the language of

the claim regarding the terminal ring being spring-fitted. Applicant believes that this term means that the ring, by virtue of its springiness holds itself in position around the base. In this case, the ring has no spring feature itself and is held in position by the projection of the base. By way of the present amendment, Applicant has amended this feature to refer to "radially spring-fitted." This indicates that the ring is pulled in a radial direction which helps it define over the arrangement of the reference where the projection prevents movement of the ring in the axial direction. Accordingly, Applicant submits that claim 6 is allowable since the reference does not show the combination of elements described in claim 6 including a base of insulating resin material and a terminal ring of conducting material which is radially spring-fitted to the base and which has a number of terminals for connection. Accordingly, Applicant submits that claim 6 defines over this reference.

Claims 8-10 depend from claim 6 and as such are also considered to be allowable. In addition, each of these claims recite other features which make these claims additionally allowable, in combination with the features of claim 6.

Rejection Under 35 U.S.C § 103

Claim 7 stands rejected under 35 U.S.C. § 103 as being obvious over Japanese document 4-64975 in view of Terada (5,272,405). The Examiner states that the Japanese document does not show a terminal ring having a split with a free internal diameter less than the diameter of the cylindrical portion. The

Examiner relies on the Terada reference to show such a terminal ring with a split. Applicant disagrees with this understanding of the reference.

First, the device shown in Terada is a commutator rather than a star ring. Secondly, this device is formed with a split as suggested by the Examiner. However, it is filled with solder before being molded to resin body 18. Since the resin body which corresponds to the base is molded within the ring, the ring cannot have a smaller diameter than that of the base. Further, it is also noted that the Terada device cannot be spring-fitted to the insulator since the base is molded around it. For these reasons, Applicant submits that claim 7 also defines over this combination of references.

Claims 1, 2, 4 and 5 stand rejected under 35 U.S.C. § 103 as being obvious over Takayuki (Japanese patent 62-272838) in view of document 4-64975. This rejection is respectfully traversed.

The Examiner points out that the Takayuki reference shows a shaft, a core, a commutator, a star connector and a plurality of coils. The Examiner further states that the star connector includes a base of insulating material fitted to the shaft. Concerning the insulating material of the base, it is only noted that the Abstract indicates the connector is insulated from the armature's shaft. The Examiner also admits that the Takayuki reference does not show the terminal ring spring-fitted to the base. The Examiner relies on document 4-64975 to show the terminal ring which is spring-fitted to the base.

By way of the present Amendment, Applicant has amended claim 1 in a

fashion similar to claim 6 to make it clear that the terminal ring is radially sprung-fitted to the base. As indicated above, in regard to the rejection of claim 6, Applicant submits that this document does not show a radial spring fitting and in fact does not show a spring fitting at all since the projections to keep the ring from sliding axially with that the ring itself does not provide any springiness in the radial direction. Accordingly, Applicant submits that this rejection is overcome. Likewise, Applicant submits that dependent claims 2, 4 and 5 which depend therefrom are likewise allowable.

Claim 3 stands rejected as being obvious over Takayuki in view of document 4-64975 as applied to claim 1 and further in view of Tarada. This rejection is respectfully traversed. Applicant submits that this claim is allowable based on the allowable nature of claim 1 as indicated above. Furthermore, Applicant submits that the Tarada reference does not show the features of claim 3 for the reasons cited above in regard to claim 7. Accordingly, claim 3 is also considered to allowable.

Claims 11-14 stand rejected under 35 U.S.C. § 103 as being obvious over Shimoyama et al. (5,552,652) in view of Ziegler et al. (5,912,523) and Strobl (5,442,849). This rejection is respectfully traversed.

The Examiner states that the Shimoyama et al. reference shows a star connector with a base 7, a conductive ring 12, terminals 9 where the base has a wall extending radially and a skirt extending axially from the wall. The Examiner states that the conductive ring 12 has a flat ring portion 4 with each terminal

having axially U-shaped portions which extend through the openings. The Examiner admits that this reference does not show a base with openings in the skirt and a number of buttresses. The Examiner relies on the Ziegler et al. reference to show the openings and the Strobl reference to show the buttresses.

First, Applicant submits that the Examiner has not met his burden of showing the obviousness of combining the references. The Examiner merely states that the new references are from the same field of endeavor and that therefore it would have been obvious. Applicant submits that there is no motivation described for adding the buttresses from Strobl and the openings of Ziegler et al. to the Shimoyama et al. device. Applicant submits that without such motivation this combination was not obvious.

Furthermore, claim 11 has now been amended to further describe the openings in the skirt as extending axially through the wall. That is, as seen in Figure 5 of the present invention, the openings 42 start at the top of the skirt and extend downwardly to the level of the wall so that the ring may be dropped into place. This differs from the arrangement shown in Shimoyama et al., Ziegler et al. and Strobl where the openings are only as large as the terminals and do not extend axially through the skirt. Accordingly, none of these references individually or in combination show this feature. For these reasons, Applicant submits that claim 11 is allowable over these references.

Claims 12-14 depend from claim 11 and as such are also considered to be allowable. In addition, claim 12 requires a tapered inner surface which is not

seen in the references. Claim 13 requires a plurality of detents in the skirt and claim 14 requires a number of detents in the base. The Examiner has referred to the various projections of the ring such as 8 and 5 of Shimoyama et al. to show the detents. However, these claims require that the detents be in the skirt and base, not in the ring. Accordingly, Applicant submits that the Examiner's rejection of these claims is incorrect.

CONCLUSION

In view of the above remarks, it is believed that the claims clearly distinguish over the patents relied on by the Examiner either alone or in combination. In view of this, reconsideration of the rejections and allowance of all the claims is respectfully requested.

In the event that any outstanding matters remain in this application, the Examiner is invited to contact Robert F. Gnuse (Reg. No. 27,295) at (703) 205-8000 in the Washington, D.C. area.

Attached hereto is a marked-up version of the changes made to the application by this Amendment.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By Joe McKinney Muncy
Joe McKinney Muncy, #32,334
P.O. Box 747
Falls Church, VA 22040-0747
(703) 205-8000

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Attachment: Version with Markings to Show Changes Made

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Claims 1,6 and 11have been amended as follows:

1. (Twice Amended) A star connected wound rotor for a miniature electric motor comprising:
 - a shaft;
 - an armature core fitted to the shaft and having a plurality of armature poles;
 - a commutator having a plurality of commutator segments for making sliding contact with a brush assembly, the commutator being fitted to the shaft adjacent a first end of the armature core;
 - a star connector; and
 - a plurality of coils forming an armature winding, each coil being wound around an armature pole and being terminated on a segment of the commutator and on the star connector, [characterized in that]
 - the star connector [comprises] comprising a base of insulating material fitted to the shaft adjacent a second end of the armature core and a terminal ring of conductive material radially spring-fitted to the base and having a number of terminals connected to the coils, thereby forming a star connected armature winding.

6. (Twice Amended) A star connector for a wound rotor of a miniature electric motor comprising a base of insulating resin material and a terminal ring of conductive material radially spring-fitted to the base and having a number of terminals for connection of one end of each coil of the wound rotor.

11. (Amended) A star connector for electrically connecting together lead wires from coils of a wound rotor of a miniature d.c. electric motor, the connector comprising:

a base for direct mounting onto a shaft of the rotor; and

a conductive ring having terminals for termination of the lead wires;

wherein the base has a central boss portion with a central opening for receiving the shaft, a wall extending radially from the boss, a skirt extending axially from the radially outer edge of the wall, a number of openings [in] extending axially through the skirt and a number of buttresses formed on the wall and the base remote from the skirt but adjacent the openings, and

wherein the conductive ring has a flat ring portion located against the wall of the base and supported by the skirt and having a number of terminals extending radially from the ring portion, each terminal having an axially U-shaped portion, the terminals extending through the opening in the skirt with the U-shaped portions located radially adjacent the buttresses.